

WHAT IS CLAIMED IS:

1. A system for controlling an internal combustion engine having a plurality of cylinders and mounted on a vehicle, comprising:

5 an engine operation controller that conducts a switching control of engine operation based on a load of the engine between a full-cylinder operation in which all of the cylinders are operative and a cut-off cylinder operation in which some of the cylinders are inoperative;

10 a running controller that conducts a running control including at least one of a cruise control in which the vehicle runs at a desired vehicle velocity and a preceding vehicle follow-up control in which the vehicle runs at a desired vehicle velocity to maintain a desired inter-vehicle distance from a preceding vehicle; and

15 an acceleration suppression controller that conducts an acceleration suppression control if the engine operation is switched from the cut-off cylinder operation to the full-cylinder operation when the running control is in progress.

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2. A system according to claim 1, wherein the acceleration suppression controller conducts the acceleration suppression control by calculating a second desired vehicle velocity that is a value reduced from the desired vehicle velocity in such a manner that the running controller conducts the running control such that the vehicle runs at the second desired vehicle velocity.

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25 3. A system according to claim 2, wherein the acceleration suppression controller calculates the second desired vehicle velocity in such a manner that the second desired vehicle velocity is increased gradually to return to the desired vehicle velocity each time the second desired vehicle velocity is calculated.

4. A system according to claim 2, wherein, when the desired vehicle velocity is changed, the acceleration suppression controller recalculates the second desired vehicle velocity based on the changed desired vehicle velocity.

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5. A system according to claim 2, wherein the acceleration suppression controller causes the running controller to conduct the running control such that the vehicle runs at the desired vehicle velocity, when the second desired vehicle velocity is equal to or greater than the desired vehicle velocity.

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6. A system according to claim 1, wherein the acceleration suppression controller conducts the acceleration suppression control by changing a desired load that is necessary for maintaining the desired vehicle velocity.

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7. A system according to claim 6, wherein the acceleration suppression controller discontinues the acceleration suppression control when a predetermined period of time has passed since the change of the desired load.

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8. A system according to claim 6, wherein the acceleration suppression controller discontinues the acceleration suppression control when a difference between the desired vehicle velocity and a detected vehicle velocity is less than a predetermined value.

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9. A system according to claim 6, wherein the acceleration suppression

controller discontinues the acceleration suppression control when a condition for conducting the running control is changed.

5           10. A system according to claim 1, further including:  
a desired vehicle velocity increasing/decreasing switch that is manipulated by  
an operator to input an instruction to increase or decrease the desired vehicle velocity;  
and wherein the acceleration suppression controller discontinues the  
acceleration suppression control when the instruction is inputted.

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11. A system according to claim 1, wherein the running controller conducts the  
running control such that the vehicle runs at a desired vehicle acceleration;

15           and the acceleration suppression controller conducts the acceleration  
suppression control by calculating a second desired vehicle acceleration that is a value  
reduced from the desired vehicle acceleration in such a manner that the running  
controller conducts the running control such that the vehicle runs at the second desired  
vehicle acceleration.

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12. A system according to claim 11, wherein the acceleration suppression  
controller discontinues the acceleration suppression control when a predetermined  
period of time has passed since the desired vehicle acceleration was changed to the  
second desired vehicle acceleration.

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13. A system according to claim 11, wherein the acceleration suppression  
controller discontinues the acceleration suppression control when a difference between

the desired vehicle velocity and a detected vehicle velocity is less than a predetermined value.

5           14. A system according to claim 11, wherein the acceleration suppression controller discontinues the acceleration suppression control when a condition for conducting the running control is changed.

10           15. A system according to claim 1, wherein the acceleration suppression controller conducts the acceleration suppression control by calculating a second desired inter-vehicle distance that is a value obtained by reducing a difference between the desired inter-vehicle distance and a detected inter-vehicle difference from the preceding vehicle, in such a manner that the running controller conducts the running control such  
15           that the vehicle runs with the second desired inter-vehicle distance.

            16. A system according to claim 15, wherein the acceleration suppression controller calculates the second desired inter-vehicle distance in such a manner that the  
20           second desired inter-vehicle distance is increased gradually to return to the desired inter-vehicle distance each time the second desired inter-vehicle distance is calculated.

            17. A system according to claim 15, wherein, when the desired inter-vehicle  
25           distance is changed, the acceleration suppression controller recalculates the second desired inter-vehicle distance based on the changed desired inter-vehicle distance.

18. A system according to claim 15, wherein the acceleration suppression controller causes the running controller to conduct the running control such that the vehicle runs with the desired inter-vehicle distance, when the second desired inter-vehicle distance is less than the desired inter-vehicle distance.

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19. A system according to claim 1, further including:

a desired inter-vehicle distance increasing/decreasing switch that is manipulated by an operator to input an instruction to increase or decrease the desired inter-vehicle distance;

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and wherein the acceleration suppression controller discontinues the acceleration suppression control when the instruction is inputted.

20. A method of controlling an internal combustion engine having a plurality of cylinders and mounted on a vehicle, comprising the steps of:

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conducting a switching control of engine operation based on a load of the engine between a full-cylinder operation in which all of the cylinders are operative and a cut-off cylinder operation in which some of the cylinders are inoperative;

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conducting a running control including at least one of a cruise control in which the vehicle runs at a desired vehicle velocity and a preceding vehicle follow-up control in which the vehicle runs at a desired vehicle velocity to maintain a desired inter-vehicle distance from a preceding vehicle; and

conducting an acceleration suppression control if the engine operation is switched from the cut-off cylinder operation to the full-cylinder operation when the running control is in progress.

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21. A method according to claim 20, wherein the step of acceleration suppression controlling conducts the acceleration suppression control by calculating a second desired vehicle velocity that is a value reduced from the desired vehicle velocity in such a manner that the step of running controlling conducts the running control such that the vehicle runs at the second desired vehicle velocity.

22. A method according to claim 21, wherein the step of acceleration suppression controlling calculates the second desired vehicle velocity in such a manner that the second desired vehicle velocity is increased gradually to return to the desired vehicle velocity each time the second desired vehicle velocity is calculated.

23. A method according to claim 21, wherein, when the desired vehicle velocity is changed, the step of acceleration suppression controlling recalculates the second desired vehicle velocity based on the changed desired vehicle velocity.

24. A method according to claim 21, wherein the step of acceleration suppression controlling causes the step of running controlling to conduct the running control such that the vehicle runs at the desired vehicle velocity, when the second desired vehicle velocity is equal to or greater than the desired vehicle velocity.

25. A method according to claim 20, wherein the step of acceleration suppression controlling conducts the acceleration suppression control by changing a desired load that is necessary for maintaining the desired vehicle velocity.

26. A method according to claim 25, wherein the step of acceleration suppression controlling discontinues the acceleration suppression control when a predetermined period of time has passed since the change of the desired load.

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27. A method according to claim 25, wherein the step of acceleration suppression controlling discontinues the acceleration suppression control when a difference between the desired vehicle velocity and a detected vehicle velocity is less than a predetermined value.

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28. A method according to claim 25, wherein the step of acceleration suppression controlling discontinues the acceleration suppression control when a condition for conducting the running control is changed.

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29. A method according to claim 20, further including the step of:  
inputting an instruction of an operator to increase or decrease the desired vehicle velocity;

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and wherein the step of acceleration suppression controlling discontinues the acceleration suppression control when the instruction is inputted.

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30. A method according to claim 20, wherein the step of running controlling conducts the running control such that the vehicle runs at a desired vehicle acceleration;

and the step of acceleration suppression controlling conducts the acceleration suppression control by calculating a second desired vehicle acceleration that is a value

reduced from the desired vehicle acceleration in such a manner that the step of running controlling conducts the running control such that the vehicle runs at the second desired vehicle acceleration.

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31. A method according to claim 30, wherein the step of acceleration suppression controlling discontinues the acceleration suppression control when a predetermined period of time has passed since the desired vehicle acceleration was changed to the second desired vehicle acceleration.

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32. A method according to claim 30, wherein the step of acceleration suppression controlling discontinues the acceleration suppression control when a difference between the desired vehicle velocity and a detected vehicle velocity is less than a predetermined value.

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33. A method according to claim 30, wherein the step of acceleration suppression controlling discontinues the acceleration suppression control when a condition for conducting the running control is changed.

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34. A method according to claim 20, wherein the step of acceleration suppression controlling conducts the acceleration suppression control by calculating a second desired inter-vehicle distance that is a value obtained by reducing a difference between the desired inter-vehicle distance and a detected inter-vehicle difference from the preceding vehicle, in such a manner that the step of running controlling conducts the running control such that the vehicle runs with the second desired inter-vehicle

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distance.

5        35. A method according to claim 34, wherein the step of acceleration suppression controlling calculates the second desired inter-vehicle distance in such a manner that the second desired inter-vehicle distance is increased gradually to return to the desired inter-vehicle distance each time the second desired inter-vehicle distance is calculated.

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36. A method according to claim 34, wherein, when the desired inter-vehicle distance is changed, the step of acceleration suppression controlling recalculates the second desired inter-vehicle distance based on the changed desired inter-vehicle distance.

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37. A method according to claim 34, wherein the step of acceleration suppression controlling causes the step of running controlling to conduct the running control such that the vehicle runs with the desired inter-vehicle distance, when the  
20        second desired inter-vehicle distance is less than the desired inter-vehicle distance.

38. A method according to claim 20, further including the step of:  
inputting an instruction of an operator to increase or decrease the desired  
25        inter-vehicle distance;

and wherein the step of acceleration suppression controlling discontinues the acceleration suppression control when the instruction is inputted.